

Service Manual

**CIRCUIT & MECHANISM
DESCRIPTIONS
REPAIR & ADJUSTMENTS**

PIONEER



**ORDER NO.
ARP 1116-0**

STEREO TURNTABLE

PL-770(BK)

PL-770

MODEL PL-770 COMES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Applicable model		Power requirement	Destination
	PL-770(BK)	PL-770		
WEM	○	○	AC 220V – 240V	European continent
WB	○	○	AC 220V – 240V	United Kingdom

- This service manual is applicable to the PL-770 (BK)/WEM, WB and PL-770/WEM, WB types.
- As to the WB types, please refer to pages 28.
- Ce manuel d'instruction se réfère au mode de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.
- PL-770 (BK) is Black versions of PL-770.

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1. SPECIFICATIONS

PHONOGRAPH MOTOR AND PLATTER

Motor type.....Quartz PLL Hall motor
Drive system.....Direct drive system
Speed of rotation.....2 speeds: 33-1/3, 45 rpm
Wow and Flutter.....Less then *0.012% (WRMS)
0.025% (WRMS)
+ 0.035% WTD Peak (DIN)

Values marked with an "*" designate the wow and flutter for the motor, and do not include the cartridge or tonearm load.

Motor characteristics

Start up.....	Less then 1/3 revolution
Speed variation	Less then 0.002%
Drift	Time: 0.0003%/h
	Temp: 0.003%/°C

S/N ratio 78 dB (DIN-B)
Platter Diameter 304 mm,
aluminium die cast

TONE ARM

Type Integrated straight tone arm
Effective arm length 221 mm

SUPPLIED CARTRIDGE (PC-295T)

Type	MM type
Replacement stylus	PN-295T
Stylus	0.6 mil diamond
Output voltage	2.5 mV (1 kHz, 5 cm/s LAT Peak)
Suitable stylus pressure	1 - 1.5 g (optimum value 1.25 g)
Frequency response	10 Hz - 30,000 Hz
Load resistance	50 k Ω
Weight	6 g

FUNCTIONS PROVIDED

Auto return, auto cut, arm elevation, free stop hinges.

POWER SUPPLY, OTHER

Power requirements

Power requirements

European, U.K., Australian models	AC 220 V — 240 V ~, 50/60 Hz
U.S., Canadian models	AC 120 V, 60 Hz
Other destination models	AC 110 V — 120 V/220 V — 240 V ~ (switchable), 50/60 Hz

Power consumption

European, U.K., Australian models	9 W
U.S., Canadian models	9 W
Other destination models.....	5 W
External dimensions	420(W) x 118(H) x 365(D) mm
	16 - 1/2(W) x 4-5/8(H) x 14-3/8(D) in
Net weight	4.7 kg (10 lb 6 oz)

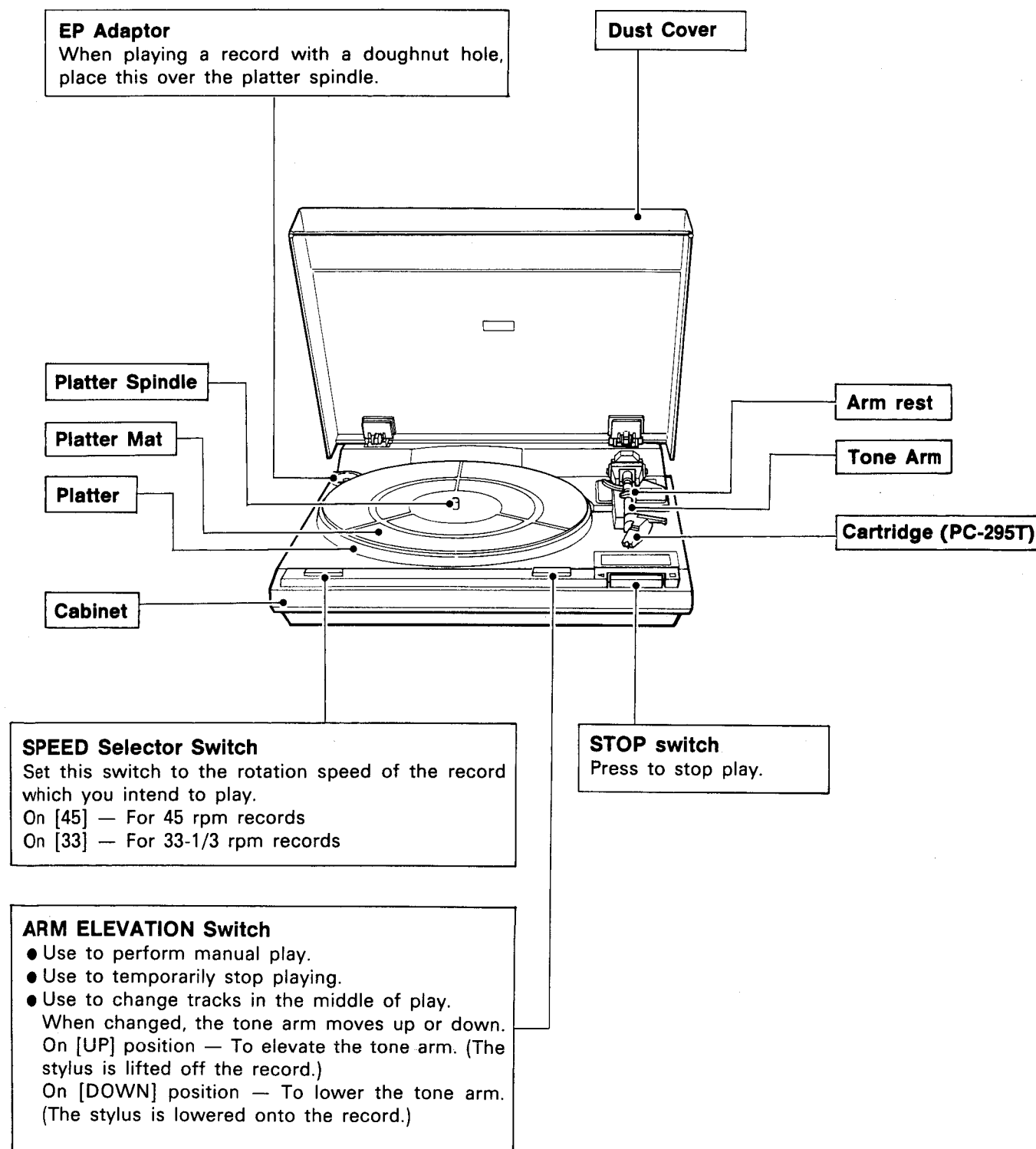
SUPPLIED ACCESSORIES

EP adaptor.....	1
Operating instructions.....	1

NOTE:

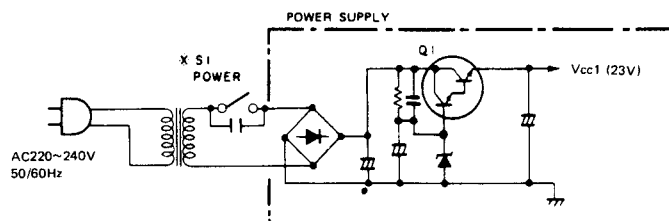
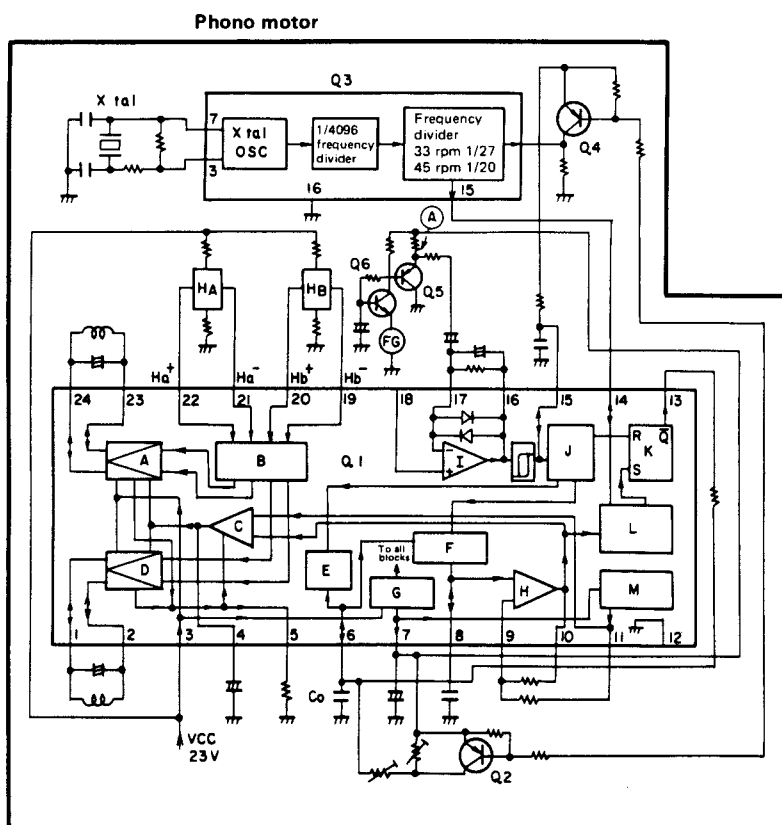
Specifications and design subject to possible modification without notice, due to improvements.

2. PANEL FACILITIES



3. BLOCK DIAGRAM

- A : Drive amplifier
- B : Hall amplifier +
position signal composite circuit
- C : V-I conversion
- D : Drive amplifier
- E : Reset circuit
- F : Sample and hold circuit
- G : Voltage regulator circuit
- H : Buffer amplifier
- I : FG amplifier
- J : Timing circuit
- K : Phase comparison
- L : Lock indicator circuit
- M : 1/2 VCC circuit



*S1 (microswitch) is at the mechanism section.

4. CIRCUIT DESCRIPTIONS

4.1 Phono Motor Circuit

The phono motor of this player uses magnetism along the outside edge of the drive magnet to determine its rpm value. (Formerly, a separate magnet was needed in addition to the drive magnet.)

This motor uses a PA2017 as its control drive IC and a crystal oscillator circuit in the oscillator circuit unit. Also, since this motor is brushless and coreless, the position of the rotor magnet is detected by two Hall elements HA and HB, which make the motor turn by switching the current to the drive coil electronically. When voltage is applied to the hall elements HA and HB, a voltage differential is created in the output interval by the magnetic field of the approaching rotor. The Hall elements HA and HB are also attached 90° electrically out of phase so their output signals have a 90° phase difference. (See Fig. 4-1)

After the output voltage from the Hall elements have been amplified by the PA2017 Hall amplifier, it enters a position signal composite circuit (See Fig. 4-3). The output from the position signal composite circuit is then input into the respective drive amplifiers. The coil current at this time is as shown in figure 4-1 coils A and B. This current produces a magnetic field in the drive coil, and the polarity of the coil and the polarity of the rotor attract and repel each other causing the motor to start turning.

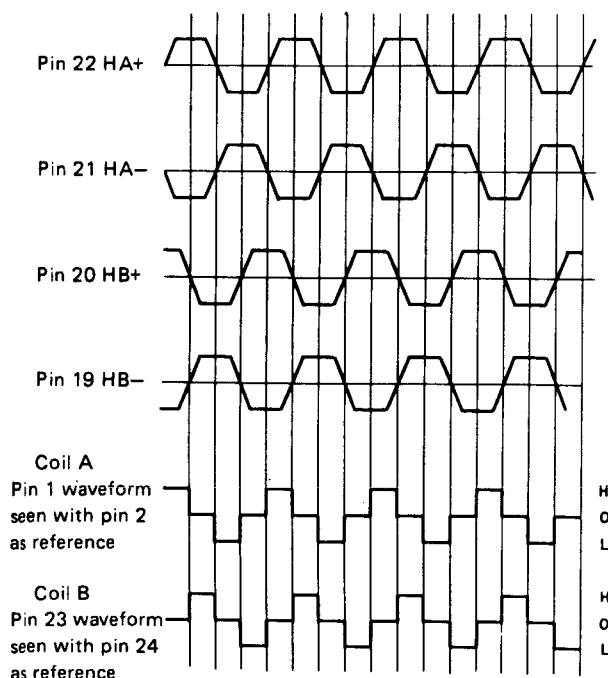


Fig. 4-1 Hall Elements and Coil Terminal Waveforms

When the motor starts turning, the signal (approximately 0.5mV p-p) produced by a frequency generator (FG) in the motor rotation unit, is amplified to about 0.3V p-p by an FG amplifier (Q5, Q6) and is input into the FG amplifier (input pin 17) inside PA2017. Possible frequencies at this point are 55.55 Hz for 33 rpm and 75 Hz for 45 rpm.

The signal then undergoes waveform shaping in the Schmitt transistor, and is then input into the reset circuit, the sample and hold circuit and finally the timing circuit for a timing pulse for the phase comparison circuit. In the PD0008, the crystal generated 6.144MHz frequency is divided into 1.5kHz (a division of 1/4096) by the frequency divider circuit. This signal is further divided by a dividing ratio selection circuit to 55.55 Hz for 33 rpm (a division of 1/27) and to 75 Hz for 45 rpm (a division of 1/20). These pulses are output to PD0008 pin 15. This reference pulse from PD0008 and the signal from the timing circuit of PA2017 undergo phase comparison in the phase comparison circuit. Output pulses can then be made in reference to the phase difference. Because these pulses speed up the charging time constants of their output sections, P - V conversion takes place. Also, F - V conversion takes place in those sections of the sample and hold circuit and the reset circuit when there is no output pulse from the phase comparison circuit. As a result, voltage which has undergone P - V and F - V conversion is output to pin 8. This output is then amplified by the buffer amplifier and input into the V - I conversion circuit. The V - I conversion circuit controls the current that flows into the drive circuit based on the difference between the output of the buffer amplifier and the reference voltage ($1/2V_{CC2}$).

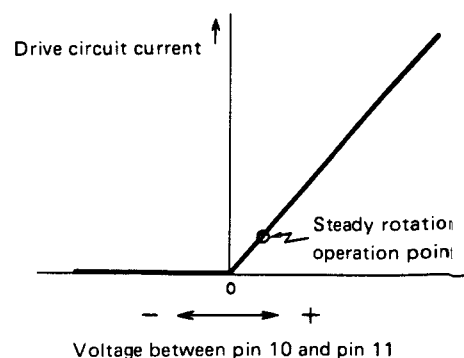


Fig. 4-2 V - I Conversion + Drive Circuit I/O Characteristics

When the motor has just begun turning, the $F - V$ conversion voltage will be higher than the reference voltage, so current will flow into the drive coil, and the motor will speed up. Gradually, the motor will return to a constant rotation speed.

When the motor spins faster than regulation speed, both the $P - V$ and $F - V$ conversion voltage become lower than the reference voltage. This causes the current to stop flowing in the drive circuit and the rpm's decrease because of a loss of torque.

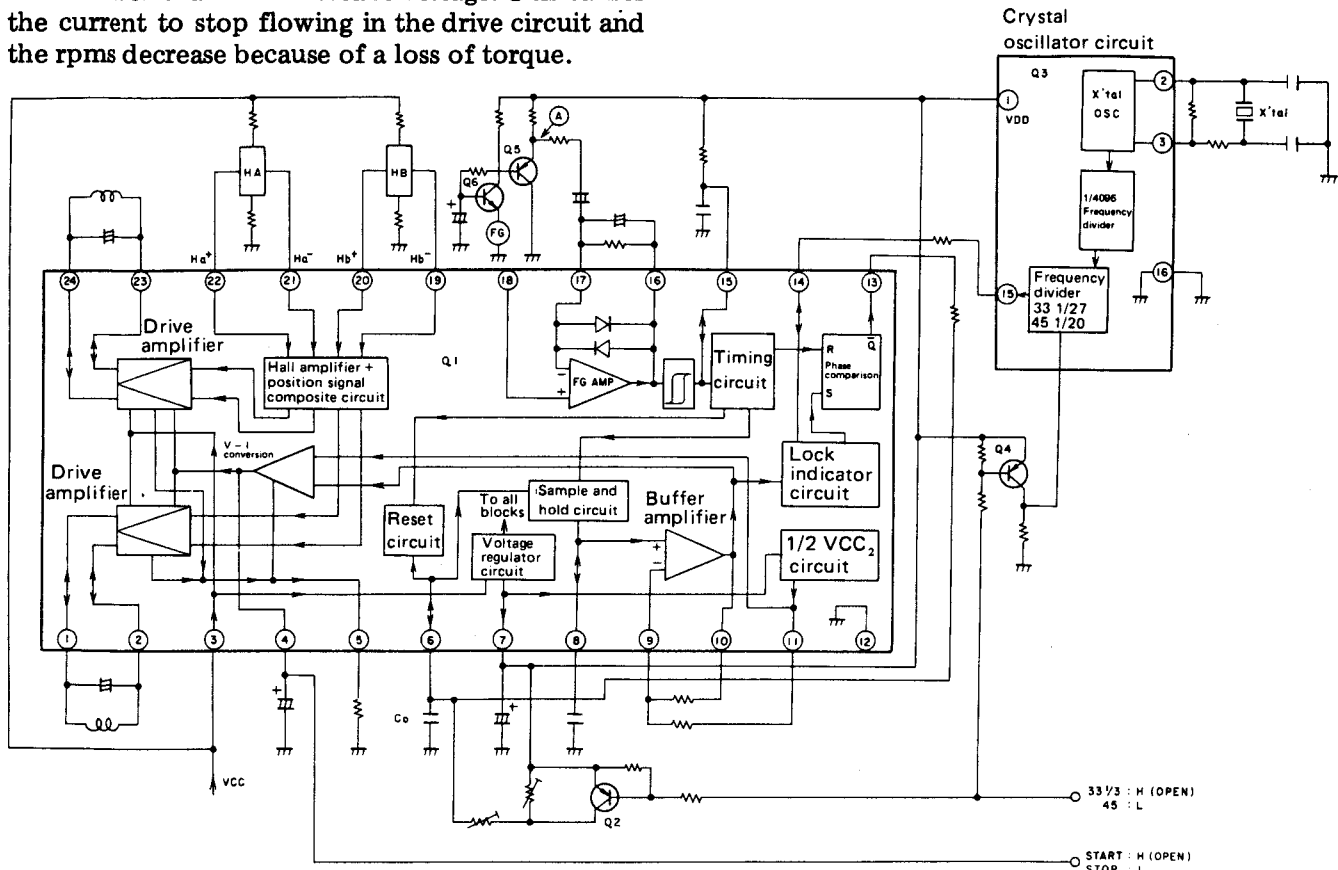


Fig. 4-3 Phono motor circuit

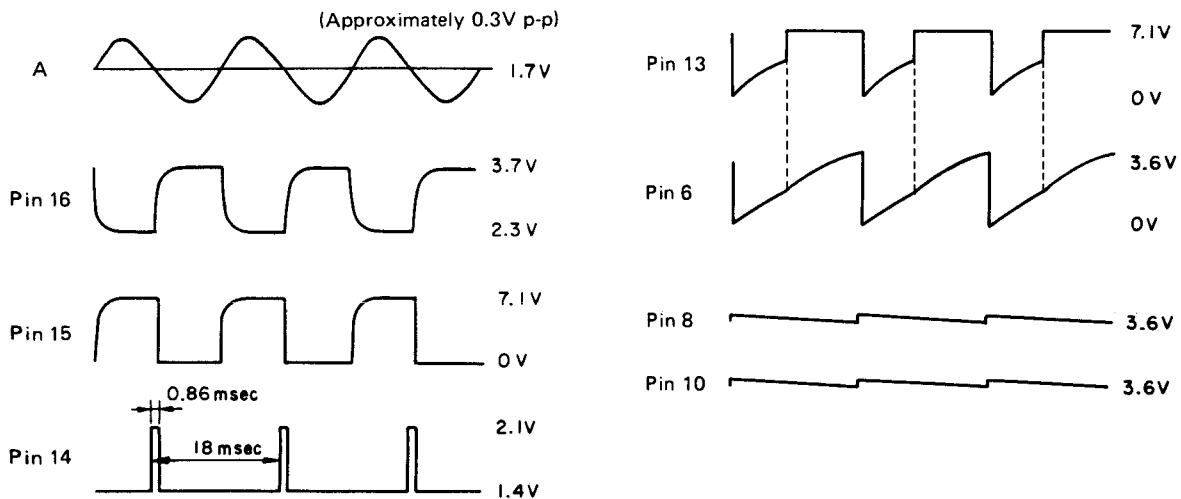


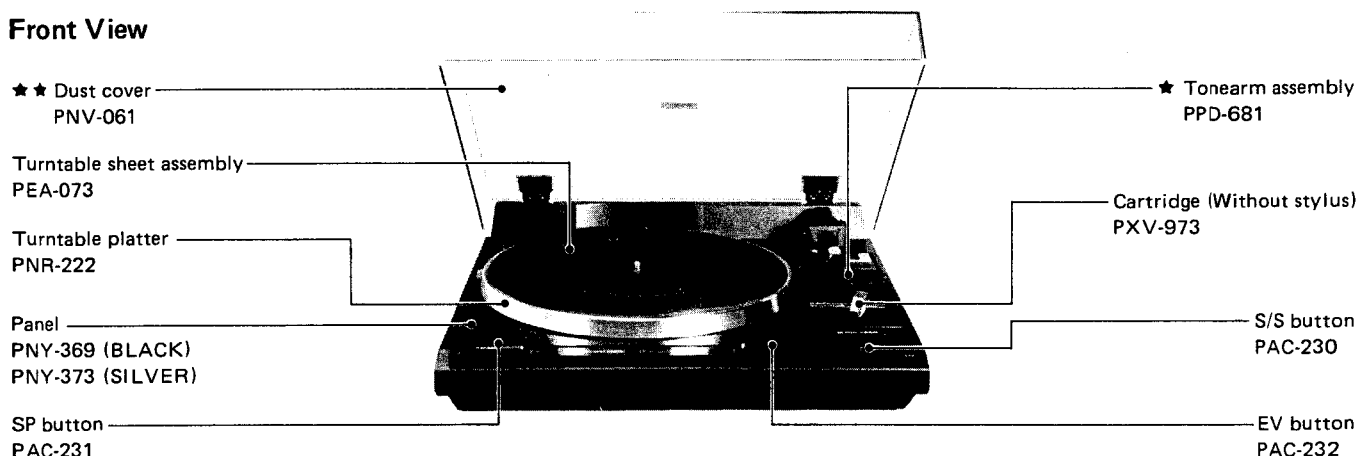
Fig. 4-4 Phono Motor Circuit Waveforms

5. PARTS LOCATION

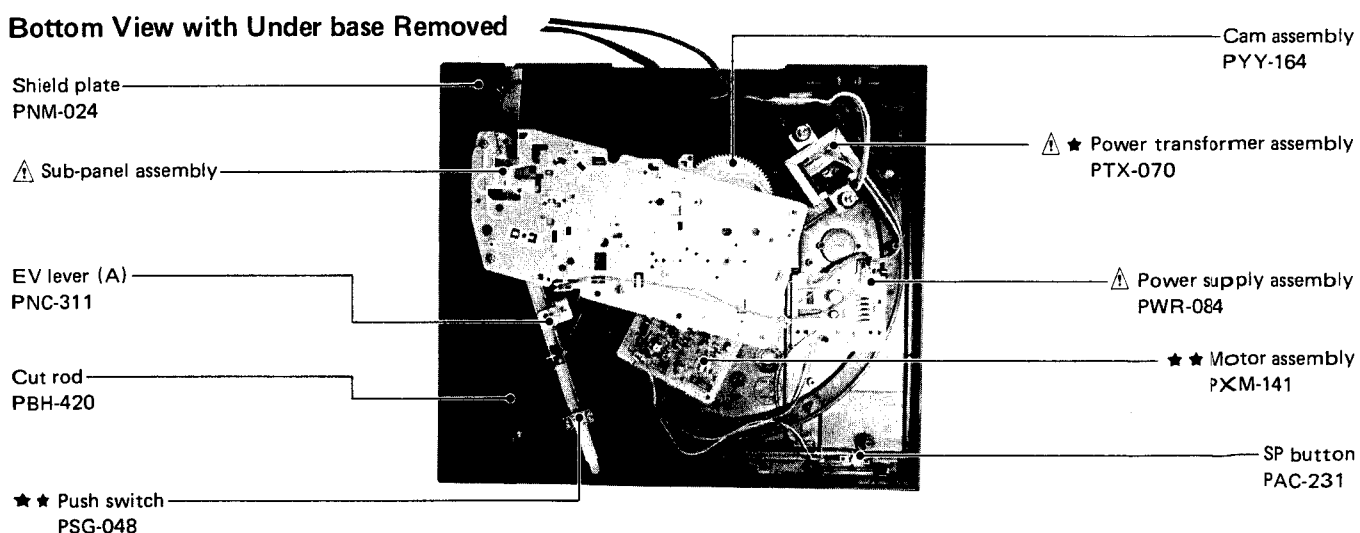
NOTES:

- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.
- ★ ★ **GENERALLY MOVES FASTER THAN ★**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

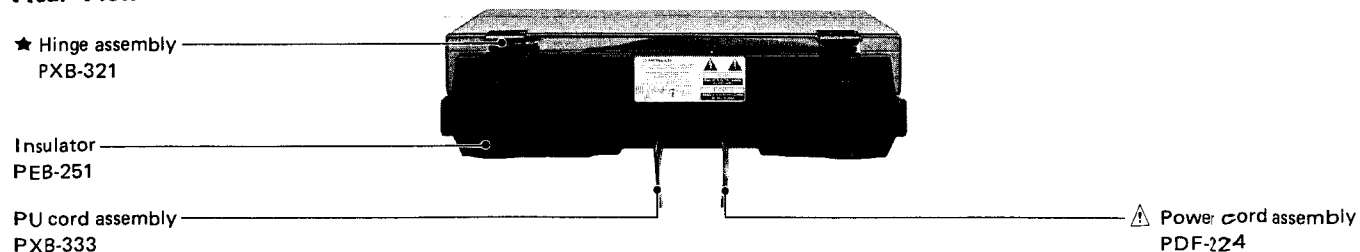
Front View



Bottom View with Under base Removed



Rear View



6. DISASSEMBLY

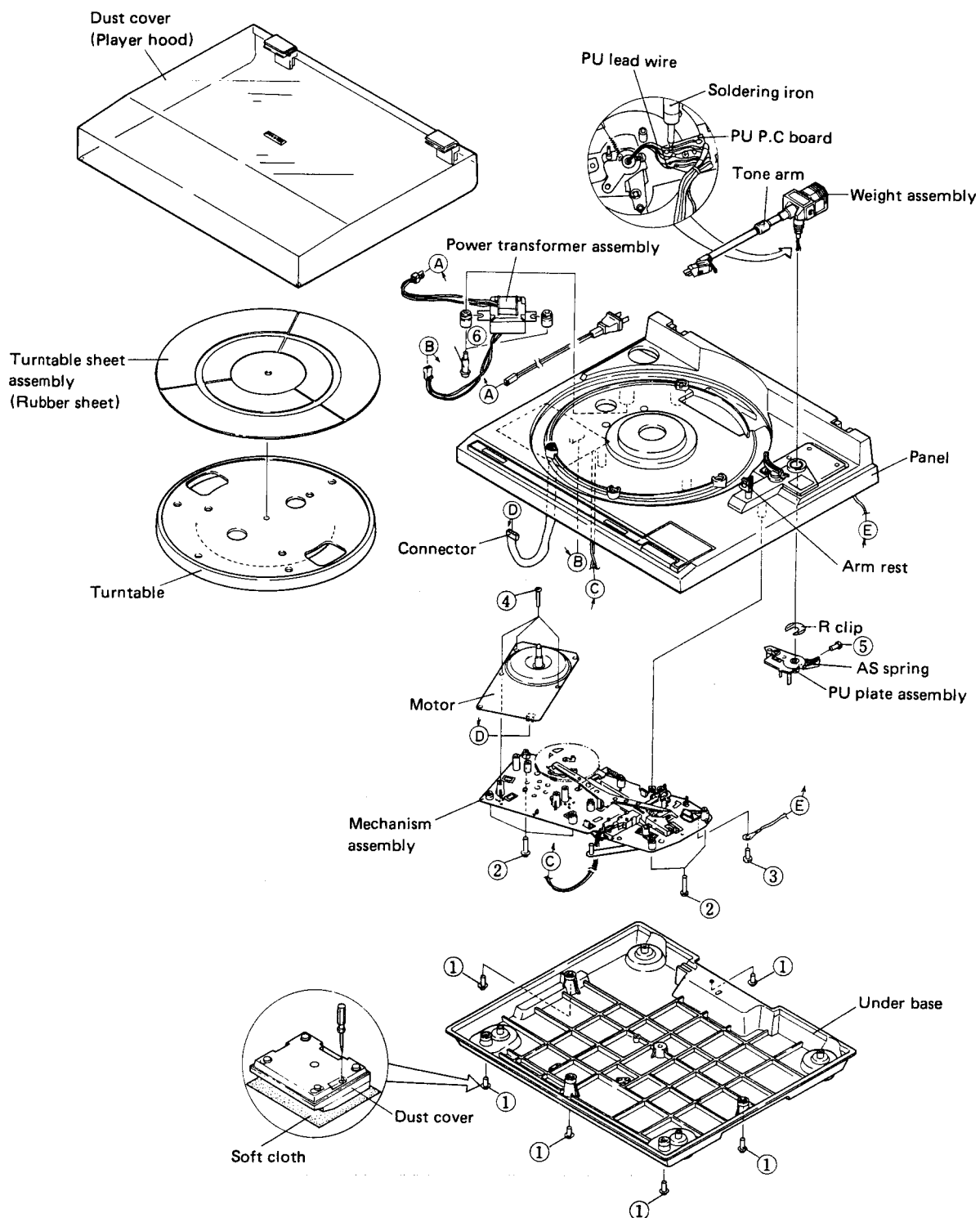


Fig. 6-1 Disassembly

● Mechanism Assembly and Motor

1. Turn on the turntable and free the mechanism.
2. Fasten the tone arm to the arm rest.
3. Remove the rubber sheet and turntable.
4. Close the player hood and turn the player upside down and place it on a soft cloth so that the player hood is not damaged.
5. Remove the six screws ①, and remove the under base.
6. Remove five screws ② and one screw ③
7. Disconnect connectors A and B
The mechanism assembly can be removed from the panel.
8. Remove the three screws ④, and remove the motor.

See pages 26 to 27 for the parts installation and assembly precautions.

● Tone Arm

1. Remove the mechanism assembly from the panel.
2. Using a soldering iron, disconnect the PU lead wires (arm lead wires) from the PU P.C. board.
3. Remove the PU plate assembly AS spring.
4. Remove the one screw ⑤, and remove the PU plate assembly from the tone arm.
5. Remove the R clip.
6. Turn the player onto its side, remove the arm rest clamp, and remove the tone arm from the panel.

● Power Transformer Assembly

Remove the two screws ⑥.

7. EXPLODED VIEW AND PARTS LIST

7.1 EXTERIOR

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List of Exterior

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description	
⚠	★	1.	PPD-681		29.	PLB-210	EV lever shaft	
		2.	PWR-084		30.	TMZ30P120FMC	Screw (3 x 12)	
		3.	PNY-369		31.	YU30FUC	Nut	
			PNY-373		32.	IPC30P100FMC	Screw (3 x 10)	
		4.	PAM-219	Screen	⚠ ★	33.	PTX-070	Power transformer assembly
		5.	PAN-141	Panel board (Black)		34.	PXB-333	PU cord assembly
			PAN-166	Panel board (Silver)	⚠	35.	PDF-224	Power cord assembly
		6.	PAC-230	S/S button		36.	PEB-250	Damper rubber
		7.	PAC-231	SP button		37.	PNM-024	Shield plate
		8.	PAC-232	EV button		38.	PBA-144	Clamp screw
	9.	PAN-066	AS board		39.	PSZ30P060FMC	Screw (3 x 6)	
	10.	IPC30P290FMC	Screw (3 x 29)		40.	PPZ30P080FMC	Screw (3 x 8)	
	11.	PNR-222	Turntable platter		41.	PDE-307	Connector assembly	
	12.	PEA-073	Turntable sheet assembly	★★	42.	PSG-050	Push switch	
	13.	PBA-170	Cartridge mounting screw		43.	PEB-251	Insulator	
	14.	PBK-059	R clip	★★	44.	PNV-061	Dust cover	
★	15.	PXB-332	Arm rest assembly	★	45.	PXB-321	Hinge assembly	
	16.	PXV-068	EV sheet unit		46.	PXV-973	Cartridge (Without stylus)	
	17.	PBH-355	EV spring	★★	47.	PXM-141	Motor assembly	
	18.	PBH-425	AS spring					
					101.		Leard wire assembly	
	19.	PXB-340	PU plate assembly		102.			
	20.	PBF-020	Washer		103.		Sub-panel assembly	
	21.	BPZ26P120FZK	Screw (2.6 x 12)		104.		Rubber sheet	
	22.	PBH-420	Cut rod		105.		Rubber foot	
	23.	PBH-339	Power lever spring					
					106.		Under base	
	24.	PNC-311	EV lever (A)					
	25.	PNC-312	EV lever (B)					
	26.	PNY-130	EV lever (C)					
	27.	PBH-375	EV lever spring					
★★	28.	PSG-048	Push switch					



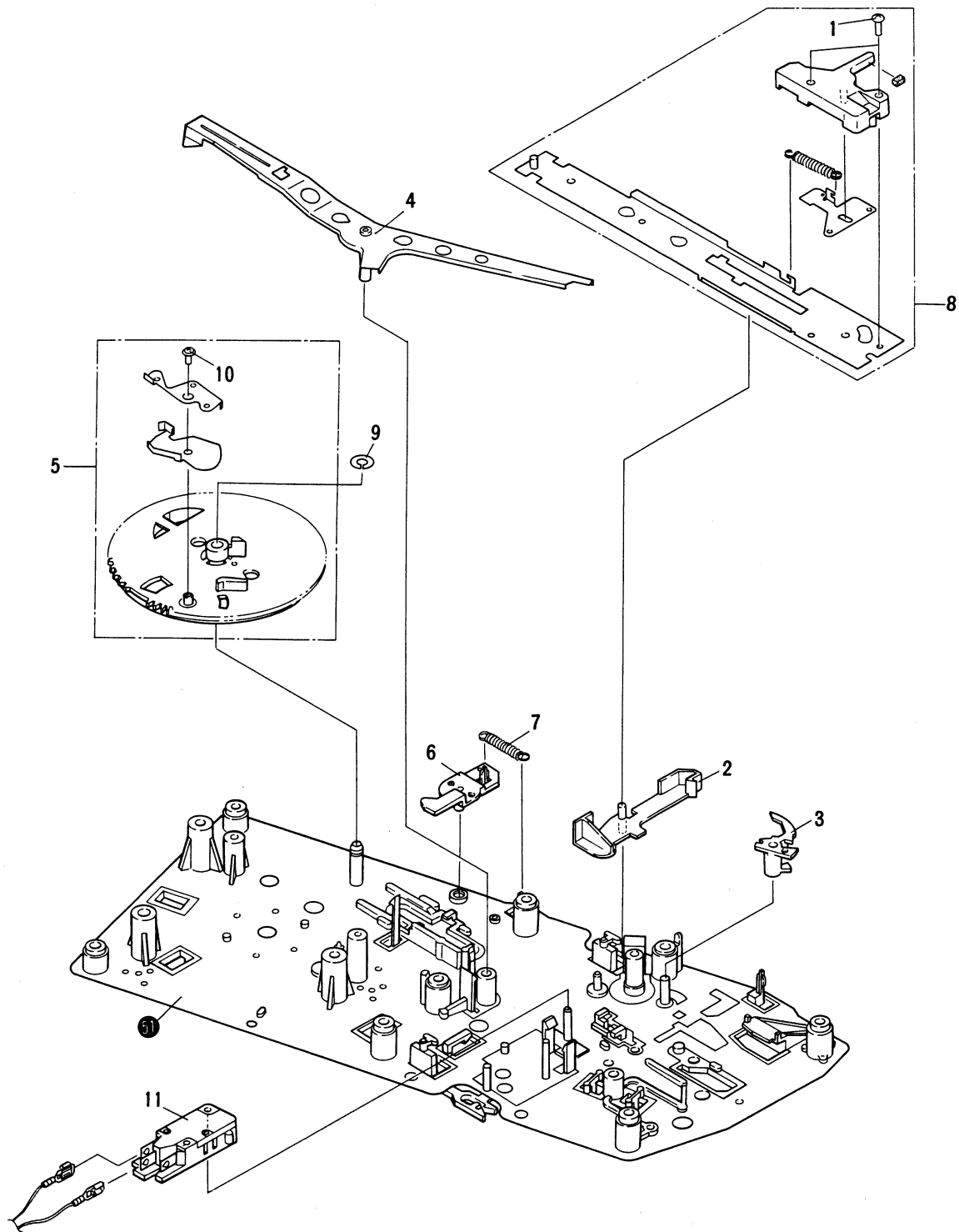
7.2 MECHANISM SECTION (SUB-PANEL ASSEMBLY)

A

B

C

D



A

B

C

D

- NOTES:
- Parts without part number cannot be supplied.
 - The $\triangle$ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
 - Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List of Mechanism Section (Sub-panel Assembly)

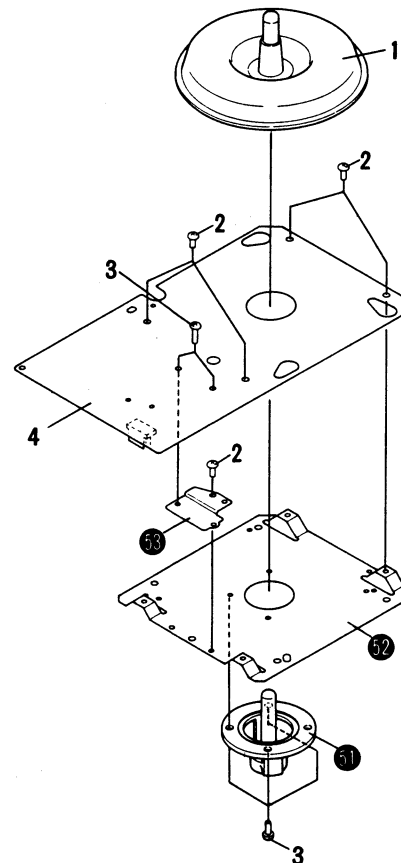
Mark	No.	Part No.	Description
	1.	PDZ30P080FMC	Screw
	2.	PNY-030	Switch lever
	3.	PNY-141	Switch locker
	4.	PXT-446	Detector lever unit
	5.	PYY-164	Cam assembly
	6.	PNY-139	Lock plate
	7.	PBH-392	Lock plate spring
	8.	PXB-232	Drive board assembly
	9.	PBF-018	Polyslider washer
	10.	PBA-172	Screw
$\triangle \star\star$	11.	PSF-023	Microswitch (POWER)
	51.		Sub-panel unit

7.3 MOTOR ASSEMBLY (PXM-141)

Parts List of Motor Assembly

Mark	No.	Part No.	Description
	1.	PXV-107	Rotor unit
	2.	PSZ30P050FMC	Screw (3 x 5)
	3.	PBZ30P100FMC	Screw (3 x 10)
	4.	PWM-197	Motor P.C. board assembly
	51.		Spindle base unit
	52.		Base
	53.		Heat sink

Motor Assembly

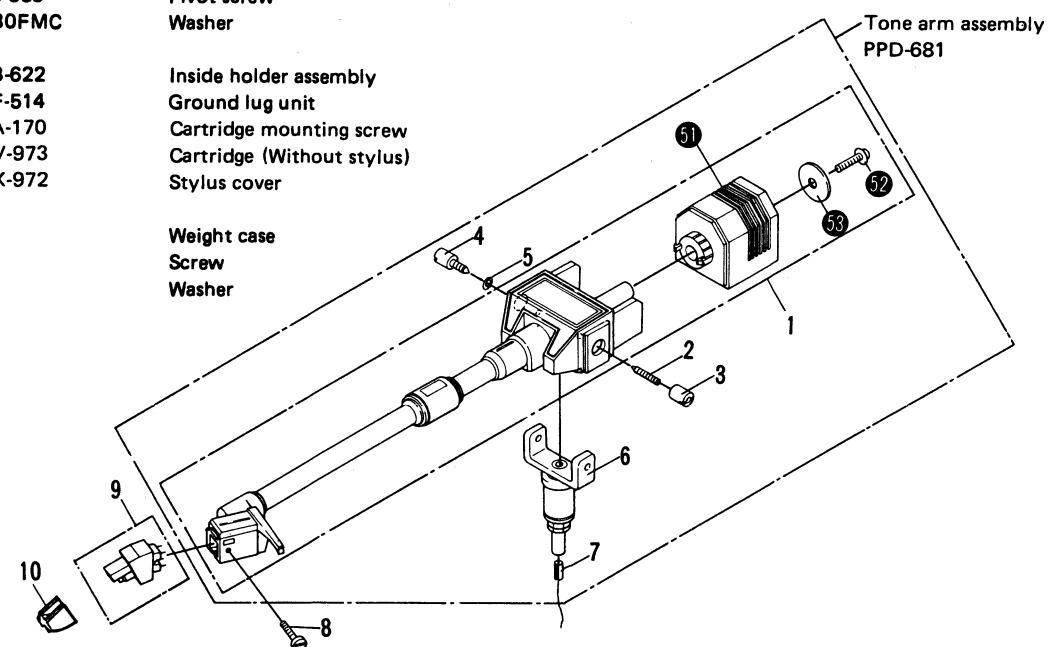


7.4 TONE ARM ASSEMBLY (PPD-681)

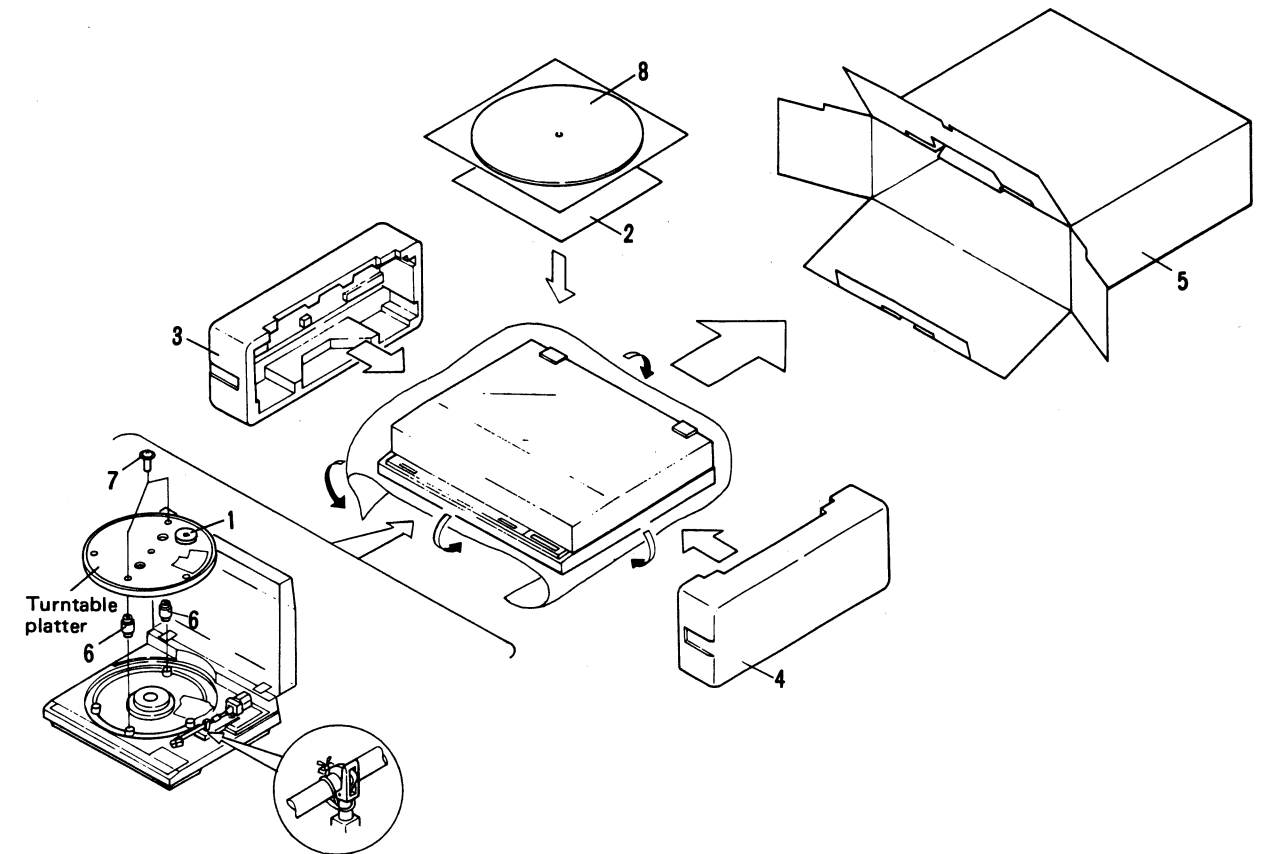
Parts List of Tone Arm Section

Mark	No.	Part No.	Description
	1.	PXB-621	Pipe holder assembly
	2.	PLB-654	Pivot
	3.	PLB-655	Pivot lock nut
	4.	PLB-653	Pivot screw
	5.	WS30FMC	Washer
	6.	PXB-622	Inside holder assembly
★ ★	7.	PDF-514	Ground lug unit
	8.	PBA-170	Cartridge mounting screw
	9.	PXV-973	Cartridge (Without stylus)
	10.	PNX-972	Stylus cover
	51.		Weight case
	52.		Screw
	53.		Washer

Tone Arm Assembly



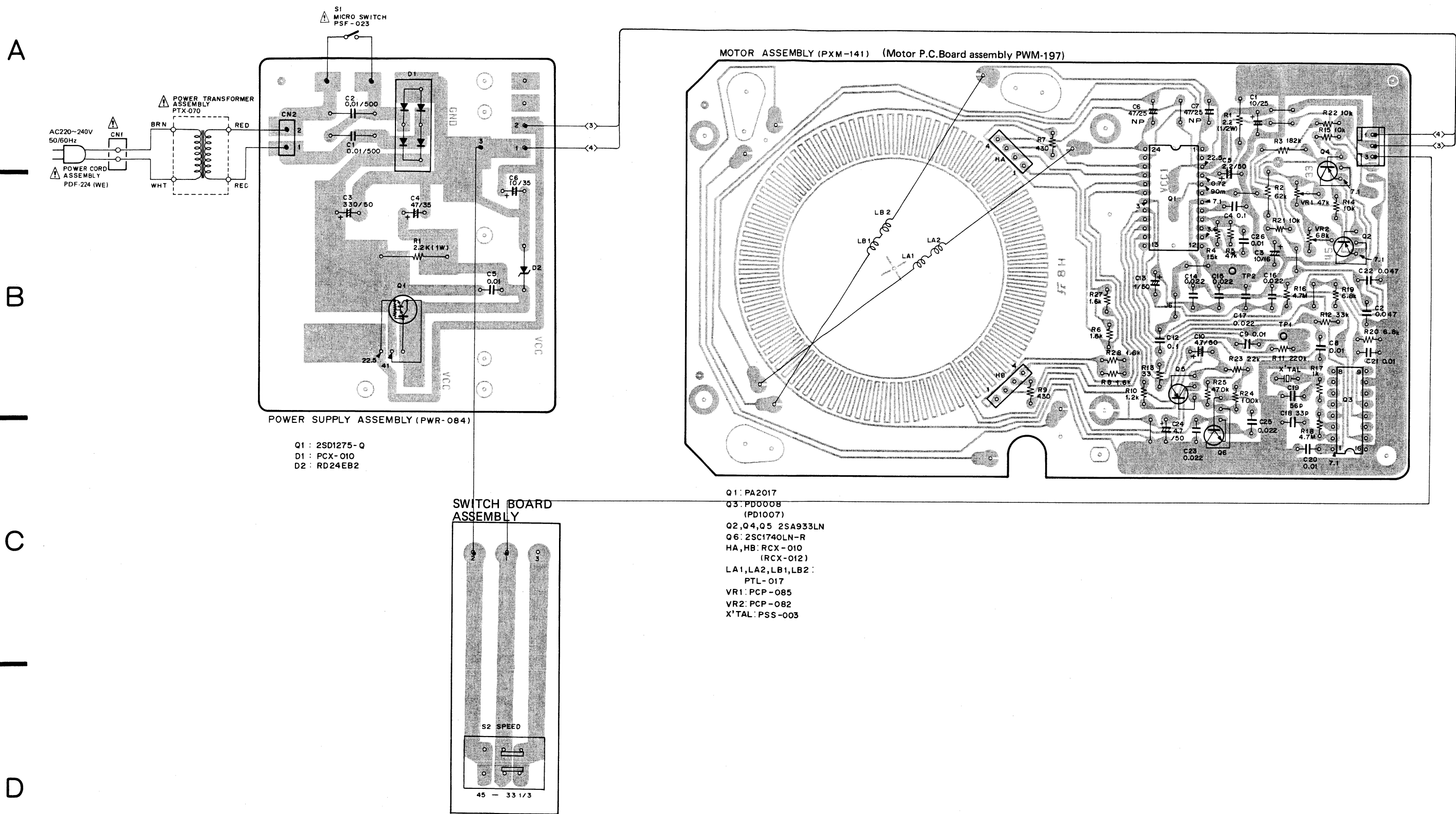
8. PACKING



Parts List of Packing

Mark	No.	Part No.	Description
	1.	N93-603	45 adaptor
	2.	PRE-065	Operating instructions (English/German/French/Italian)
	3.	PHA-173	Protector (L)
	4.	PHA-174	Protector (R)
	5.	PHH-381	Packing case (Black)
		PHH-382	Packing case (Silver)
	6.	PNY-198	Packing
	7.	PBA-178	Screw
	8.	PEA-073	Rubber sheet assembly

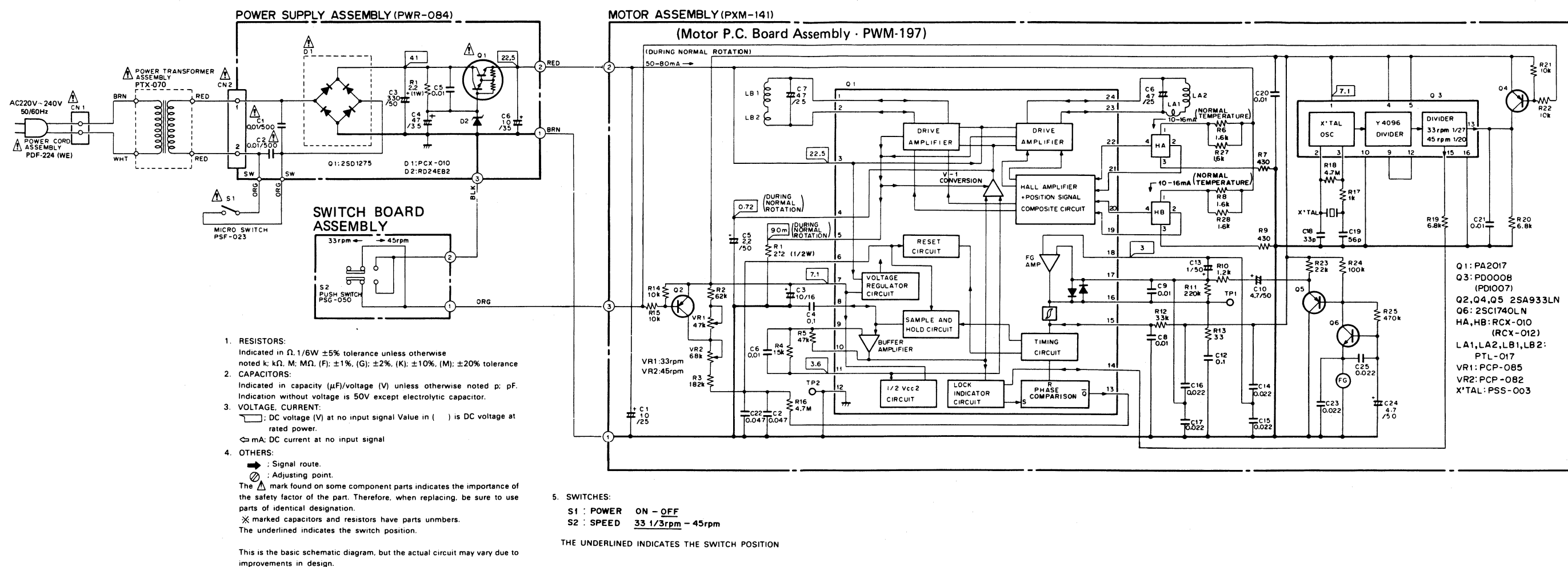
9. P.C. BOARDS CONNECTION DIAGRAM



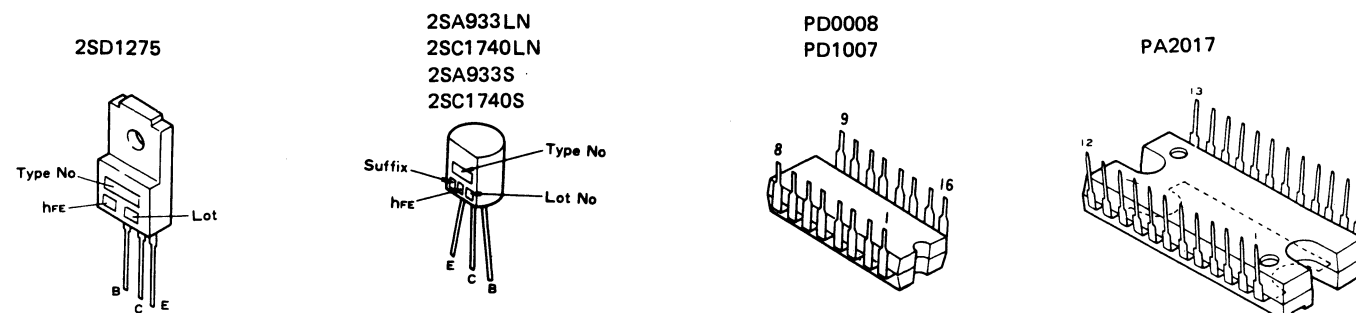
10. SCHEMATIC DIAGRAM

NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



External Appearance of Transistor and ICs



11. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.
Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).
560Ω 56 × 10¹ 561.....RD1/4PS 5 5 J
47kΩ 47 × 10³ 473.....RD1/4PS 4 7 J
0.5Ω 0R5.....RN2H 0 5 K
1Ω 010.....RS1P 0 1 0 K
Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62kΩ 562 × 10¹ 5621.....RN1/4SR 5 6 2 F
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
Parts marked by “⦿” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Power supply assembly	PWR-084
	Switch board assembly	No supply
	Motor P.C. board assembly	PWM-197

OTHERS

Mark	Symbol & Description	Part No.
★★	Motor assembly	PXM-141
⚠ ★★ S1	Microswitch (POWER)	PSF-023
⚠ ★	Power transformer assembly	PTX-070
⚠	Power cord assembly	PDF-224
	PU cord assembly	PXB-333

Power Supply Assembly (PWR-084)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠ ★★ Q1		2SD1275
⚠ ★ D1		PCX-010
★ D2		RD24EB2 (RD24EB1)

CAPACITORS

Mark	Symbol & Description	Part No.
	C3	CEA331M50L
	C4	CEA470M35
⚠	C6	CEA100M35
⚠	C1	CKDYE103P500
	C2	CKDYE103P500
	C5	CKDYF103Z50

RESISTOR

Mark	Symbol & Description	Part No.
	R1	RS1PMF222J

OTHERS

Mark	Symbol & Description	Part No.
	Screw (3 x 6)	PZZ30P060FMC

Motor P.C Board Assembly (PWM-197)
(Motor Assembly (PXM-141))

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★ Q1		PA2017
★★ Q3		PD0008 (PD1007)
★★ Q6		2SC1740LN (2SC1740S)
★★ Q2, Q4, Q5		2SA933LN (2SA933S)

CAPACITORS

Mark	Symbol & Description	Part No.
	C2	CQPA473J
	C8, C9	CQMA103K50
	C4, C12	CKDYX104M25 (PCL-046)
	C22	PCL-052
	C18	CCDCH330J50
	C19	CCKCH560J50
	C20, C21, C26	CKDYF103Z50
	C14, C15, C16, C17, C23, C25	CKDYF223Z50
	C1	CEA100M25
	C6, C7	CEANP470M25
	C3	CEA100M16
	C13	CEA010M50
	C5	CEA2R2M50
	C10, C24	CEA4R7M50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★ VR1	Semi-fixed 47k (B) (33rpm)	PCP-085
★ VR2	Semi-fixed 68k (B) (45rpm)	PCP-082
	R1	RD1/2PM2R2J
	R2, R3	RN1/4PQ□□□□F
	Other resisters	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	Crystal resonator	PSS-003
	HA, HB Hall element	RCX-010 (RCX-012)
	Screw (3 x 5)	PSZ30P050FMC
	Screw (3 x 10)	PBZ30P100FMC

Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	Switch (SPEED)	PSG-050

12. ADJUSTMENT

12.1 MOTOR OPERATION ADJUSTMENT

- Remove the underbase.
- Connect the Ach of a dual trace oscilloscope to the circuit board unit, Q3 (PD0008) pin 15, and GND. Adjust the time axis so that 1 period of the output waveform is equal to 8 divisions in the 33 rpm mode. Fig. 12-2 (a).
- Connect the Bch of a dual trace oscilloscope to Q1 (PA2017) pin 15, and GND. Adjust VR2 (45 rpm) so that the relation between the Ach and Bch waveforms in the 45 rpm mode is as shown in Fig. 12-2 (b).
- Set the turntable to 33 rpm and adjust VR1 (33 rpm) until the relation between the Ach and Bch waveforms are as shown in Fig. 12-2 (c).
- Always make motor operation adjustments starting with 45 rpm and ending with 33 rpm.

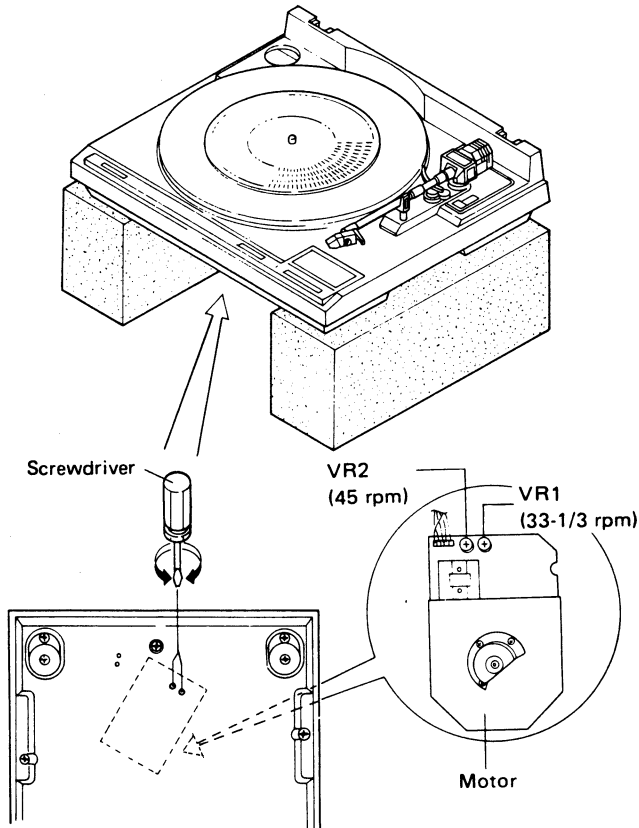


Fig. 12-1 Motor adjustment

12.2 Auto-Return Position Adjustment

When auto-return occurs too early or too late, make the following adjustments.

1. Check the stylus landing position. If the stylus does not land at the correct position, adjust the landing position.
2. Set the arm elevation switch to UP and turn the auto-return adjustment screw fully counter-clockwise.
3. Move the tone arm as far as it will go toward the inside.
4. When the auto-return adjustment screws is turned slowly clockwise, the tone arm will begin to move toward the inside.
5. Stop turning the adjustment screw at the point at which there is a space of 32 mm between the cartridge stylus and the center shaft.
6. After adjustment, check is auto-return is performed correctly and that the stylus landing position is correct.

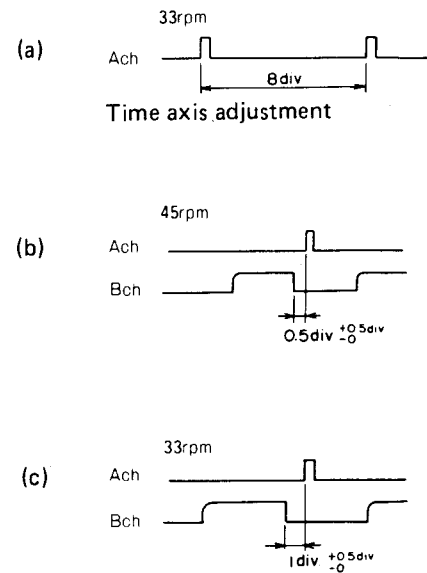


Fig. 12-2 Motor Operation Adjustment Waveforms

12.3 Arm Elevation Height Adjustment

1. Depress the arm elevation switch to lower the arm.
2. Adjust the screw under the turntable so the stylus is 11 mm above the panel. When the adjustment screw is turned counterclockwise, the stylus rises.
3. Depress the arm elevation switch to raise the tone arm.
4. Adjust the screws next to the arm elevation switch so the stylus is 25.5 mm above the panel.

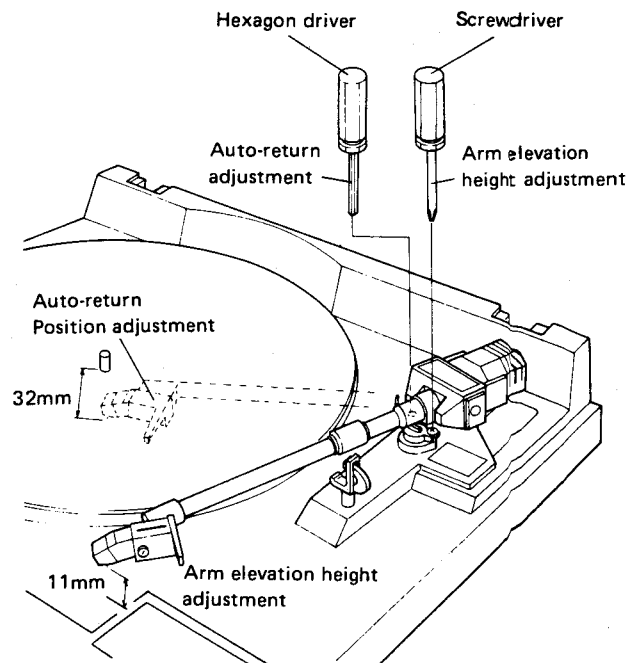


Fig. 12-3 Arm elevation height adjustment and auto-return adjustment

12. RÉGLAGE

12.1 RÉGLAGE DU FONCTIONNEMENT DU MOTEUR

1. Déposer la base inférieure.
2. Connecter le Ach de l'oscilloscope à deux traces, au bloc de la plaquette de circuit, à la broche No. 15 de Q3 (PD0008), et GND. Régler l'axe de temps de telle manière qu'une période de la forme d'onde de sortie soit égale à 8 divisions en mode de 33 tours/minute. Fig. 12-2 (a).
3. Connecter le Bch de l'oscilloscope à deux traces à la broche No. 15 de Q1 (PA2017), et GND. Régler VR2 (45 tours/minute) de telle manière que le rapport entre les formes d'onde Ach et Bch en mode de 45 tours/minute soit celui indiqué par la Fig. 12-2 (b).
4. Régler le plateau sur 33 tours/minute et régler VR1 (33 tours/minute) jusqu'à ce que le rapport entre les formes d'onde de Ach et Bch soit celui indiqué par la Fig. 12-2 (c).
5. Toujours effectuer les réglages de fonctionnement du moteur en commençant avec le mode de 45 tours/minute et en terminant avec celui 33 tours/minute.

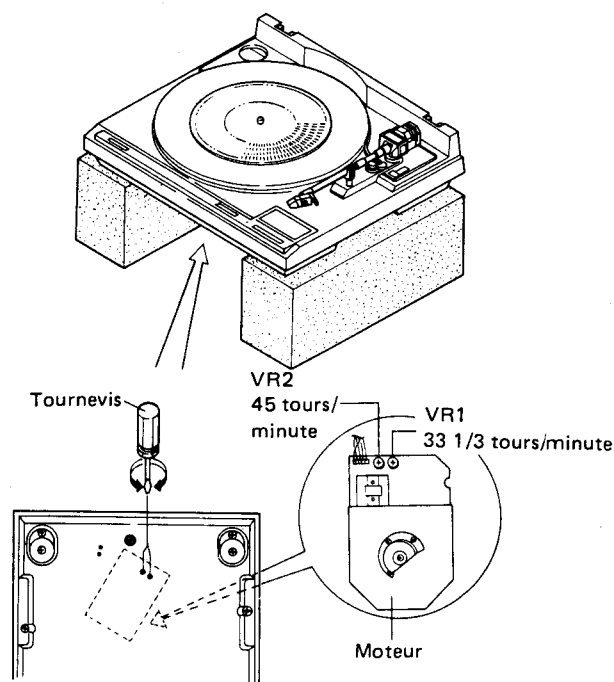


Fig. 12-1 Réglage du moteur

12.2 Réglage de la Position du Retour Automatique

Exécuter les réglages suivants au cas où le retour automatique s'effectue trop tôt ou trop tard.

1. Vérifier la position de descente de la pointe de lecture. Si celle-ci ne se pose pas sur la position correcte, régler la position de descente.
2. Placer l'interrupteur d'élévation du bras acoustique sur la position "UP" (vers le haut), et tourner la vis de réglage de retour automatique complètement dans le sens contraire des aiguilles d'une montre.
3. Déplacer le bras acoustique vers l'intérieur autant que possible.
4. Le bras acoustique se déplacera vers l'intérieur lorsque la vis de réglage du retour automatique est tournée lentement dans le sens des aiguilles d'une montre.
5. Interrompre la rotation de la vis de réglage sur le point où on obtient un écartement de 32 mm entre la pointe de la tête de lecture et l'axe central. (Fig. 12-2).
6. Après le réglage, vérifier si le retour automatique s'effectue correctement et si la position de descente de la pointe de lecture est appropriée.

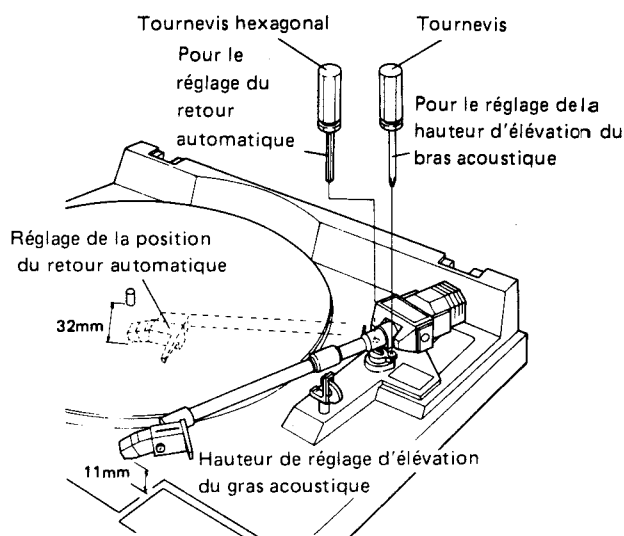


Fig. 12-2 Réglages de la hauteur d'élévation du bras acoustique et du retour automatique

12.3 Réglage de la Hauteur D'élévation du Bras Acoustique

1. Presser l'interrupteur d'élévation du bras acoustique pour abaisser le bras acoustique.

2. Régler la vis en dessous de la platine de lecture de telle manière que la hauteur de la pointe de lecture soit de 11 mm au-dessus du panneau. La pointe de lecture se lève lorsque l'on tourne la vis de réglage dans le sens contraire des aiguilles d'une montre.
3. Presser l'interrupteur d'élévation du bras acoustique pour soulever le bras acoustique.
4. Régler les vis du côté de l'interrupteur d'élévation du bras acoustique de telle manière que la hauteur de la pointe de lecture soit de 25,4 mm au-dessus du panneau.

12. AJUSTE

12.1 AJUSTE DE LA OPERACIÓN DEL MOTOR

1. Sacar la sub-base.
2. Conectar el Ach del osciloscopio de trazas dobles a la unidad de tablero de circuito, al pasador No. 15 de Q3 (PD0008) y GND. Ajustar el eje de tiempo, de manera que la forma de onda de salida sea igual a 8 divisiones en el modo de 33 rpm. Figura 12-2 (a).
3. Conectar el Bch del osciloscopio de trazas dobles a Q1 (PA2017) pasador No. 15, y GND. Ajustar el VR2 (45 rpm) de manera que la relación entre las formas de onda de Ach y Bch en el modo de 45 rpm sea como se muestra en la Fig. 12-2 (b).
4. Fijar el disco giratorio a 33 rpm y ajustar el VR1 (33 rpm) hasta que la relación entre las formas de onda Ach y Bch sea como se muestra en la Fig. 12-2 (c).
5. Siempre efectúe los ajustes de la operación del motor comenzando por 45 rpm y terminando con 33 rpm.

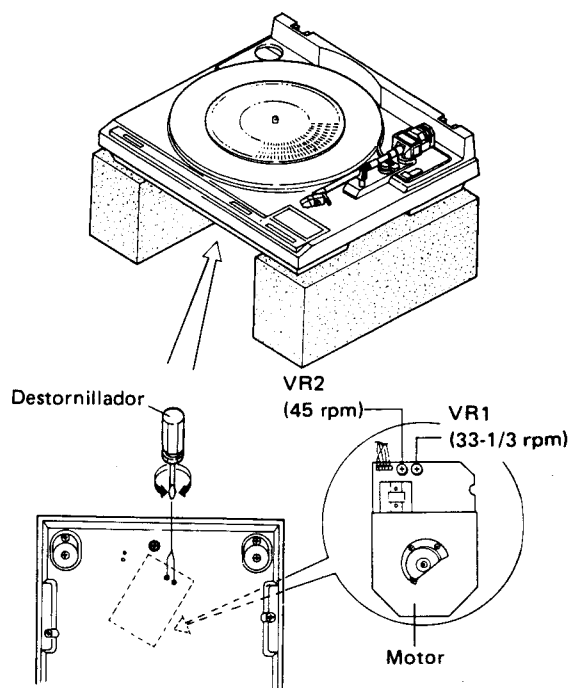


Fig. 12-1 Ajuste del motor

12.2 Ajuste de la Posición de Regreso Automático

Ejecutar los siguientes ajustes en caso de que el regreso automático ocurra muy temprano o muy tarde:

1. Verificar la posición de descanso de la aguja. Si la aguja no descansa en la posición correcta, ajustar la posición de descanso.
2. Colocar el interruptor de elevación del brazo en la posición "UP" (hacia arriba), y girar el tornillo de ajuste de regreso automático completamente en el sentido contrario al de las agujas del reloj.
3. Desplazar el brazo sonoro hacia dentro lo más lejos posible.
4. El brazo sonoro se desplazará hacia dentro cuando el tornillo de ajuste de regreso automático es girado despacio en el sentido de las agujas del reloj.
5. Interrumpir la rotación del tornillo de ajuste al punto en el cual hay un intervalo de 32 mm entre la aguja de cartucho y el eje central. (Fig. 12-2)
6. Después del ajuste, verificar si el regreso automático se ejecuta correctamente y si la posición de descanso de la aguja es apropiada.

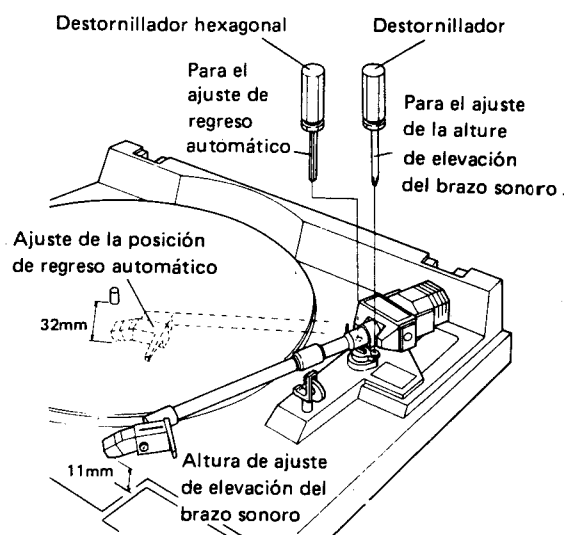


Fig. 12-2 Ajustes de la altura de elevación del brazo sonoro y de regreso automático;

12.3 Ajuste de la Altura de Elevación del Brazo Sonoro

1. Presionar el interruptor de elevación del brazo sonoro para bajar el brazo.

2. Ajustar el tornillo bajo el tocadiscos de modo que la altura de la aguja sea de 11 mm sobre el panel. La aguja se levanta cuando se gira el tornillo de ajuste en el sentido contrario al de las agujas del reloj.
3. Presionar el interruptor de elevación del brazo sonoro para levantar el brazo.
4. Ajustar los tornillos al lado del interruptor de elevación del brazo sonoro de modo que la altura de la aguja sea de 25.5 mm sobre el panel.

13. PRECAUTIONS FOR REASSEMBLY

Follow these directions and precautions when reassembling a unit after completing repairs. Be sure to lubricate as required, make no mistakes when attaching parts, and avoid all other careless mistakes that may be the cause of trouble later on.

13.1 AREAS THAT REQUIRE LUBRICATION

NOTE:

Types of lubricants and areas where they are used are listed in table 1.

Table 1

Type of Oil	Areas used
Silicon Oil #50000	raising shaft
GYA-008	all other areas

Lubrication points are specified for oils other than GYA-008. Never use a different type of oil.

• Cam Section

Apply grease to the heart-shaped grooved section (rear side of the cam) and lock plate sliding section in order to minimize wear on the sliding section and the burden on the mechanism.

• Driving Plate Assembly

Decrease the burden on the mechanism and the wear on the sliding section.

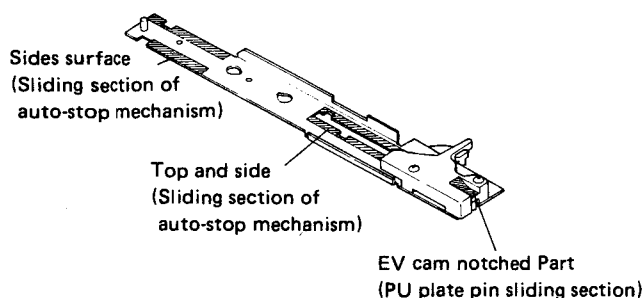


Fig. 13-1 Driving panel assembly section Switch Locker Section

• Switch Locker Section

Apply grease to the switch locker (opening) and sub-panel base sliding section to decrease the burden on the mechanism.

When applying grease to the opening (shaft hole), do not apply any grease 2 ~ 3mm from the bottom surface. If grease is applied 2~3mm within the bottom surface, it may come out the bottom and go between the switch lever and sub-panel base causing the switch lever to operate ineffectively.

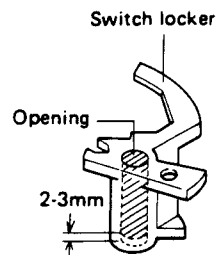


Fig. 13-2 Switch locker section

• Selector Section

Apply grease to the surface of the sub-panel base of the selector sliding section to decrease the burden on the mechanism and wear on the sliding section.

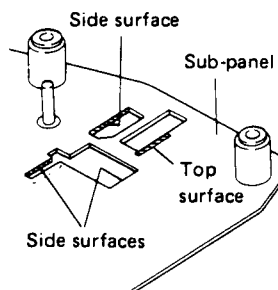


Fig. 13-3 Selector section

• EV Sheet Section

Apply oil to the raising shaft and sliding section of the bearing to assure stability in the elevation lowering speed.

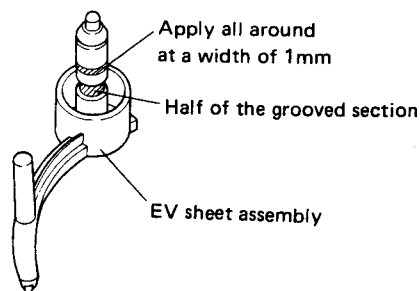


Fig. 13-4 EV sheet section

• Cam Assembly Attachment

The cam assembly is attached by letting the lock plate go in the direction ④ as shown in Fig. 13-5.

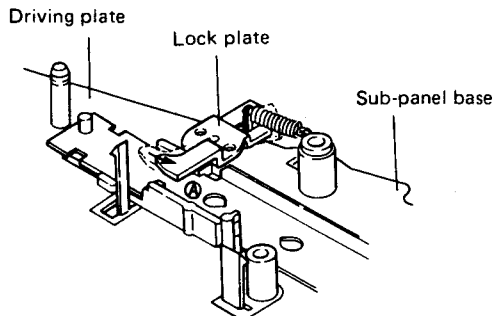


Fig. 13-5 Cam assembly attachment

• Motor Attachment

When installing the motor, set the cam in the mechanism stop location and verify that the starting plate section ⑥ does not protrude beyond surface ⑤ of the cam. If the motor is attached with the starting plate section ⑥ protruding, the starting plate may be deformed, the motor pinion gear may be scratched, and the return function may be damaged.

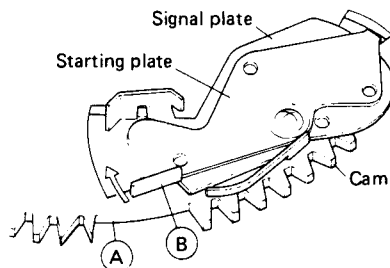


Fig. 13-6 Motor attachment

• PU Plate Attachment

Push the PU plate into place so that the PU plate bearing section touches the revolution shaft attachment nut. Installation direction is as shown in Fig. 13-7.

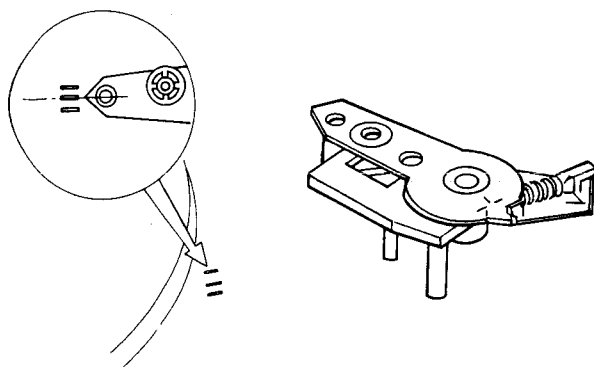


Fig. 13-7 PU plate attachment

• Mechanism Assembly Attachment

1. PU plate shaft position confirmation

When attaching the arm base section to the mechanism section, put the mechanism section switch locker and switch lever in the locked position and verify that the tonearm is in the arm rest location. Also check that the PU plate shaft is in the position shown in Fig. 13-8.

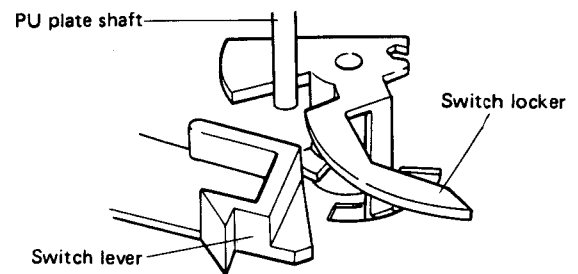


Fig. 13-8 Arm base attachment

2. PU lead wire position confirmation

When attaching the mechanism ass'y to the panel, be careful that the PU lead wire is not pinched at the panel boss as shown in Fig. 13-9.

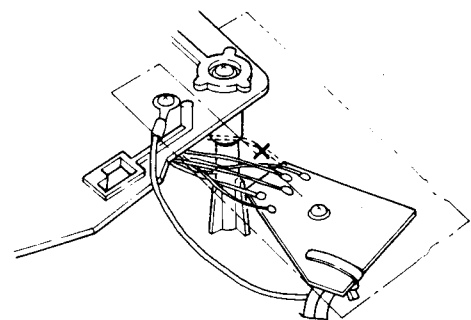


Fig. 13-9 PU lead wire attachment

14. FOR WB TYPE

NOTES:

- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

PL-770 (BK)/WB and PL-770/WB are the same as the PL-770 (BK)/WEM with the except for following sections.

Mark	Symbol & Description	Part No.				Remarks
		PL-770(BK)/WEM	PL-770/WEM	PL-770(BK)/WB	PL-770/WB	
	Panel (BLACK)	PNY-369	...	PNY-369	...	
	Panel (SILVER)	...	PNY-373	...	PNY-373	
	Panel board (BLACK)	PAN-141	...	PAN-141	...	
	Panel board (SILVER)	...	PAN-166	...	PAN-166	
	Power cord assembly	PDF-224	PDF-224	PDF-252	PDF-252	
	Operating instructions (English)	...	...	PRB-319	PRB-319	
	Operating instructions (English/German/French/Italian)	PRE-065	PRE-065	...	...	
	Packing case	PHH-381	PHH-382	PHH-381	PHH-382	

Power Supply Circuit for WB Type

